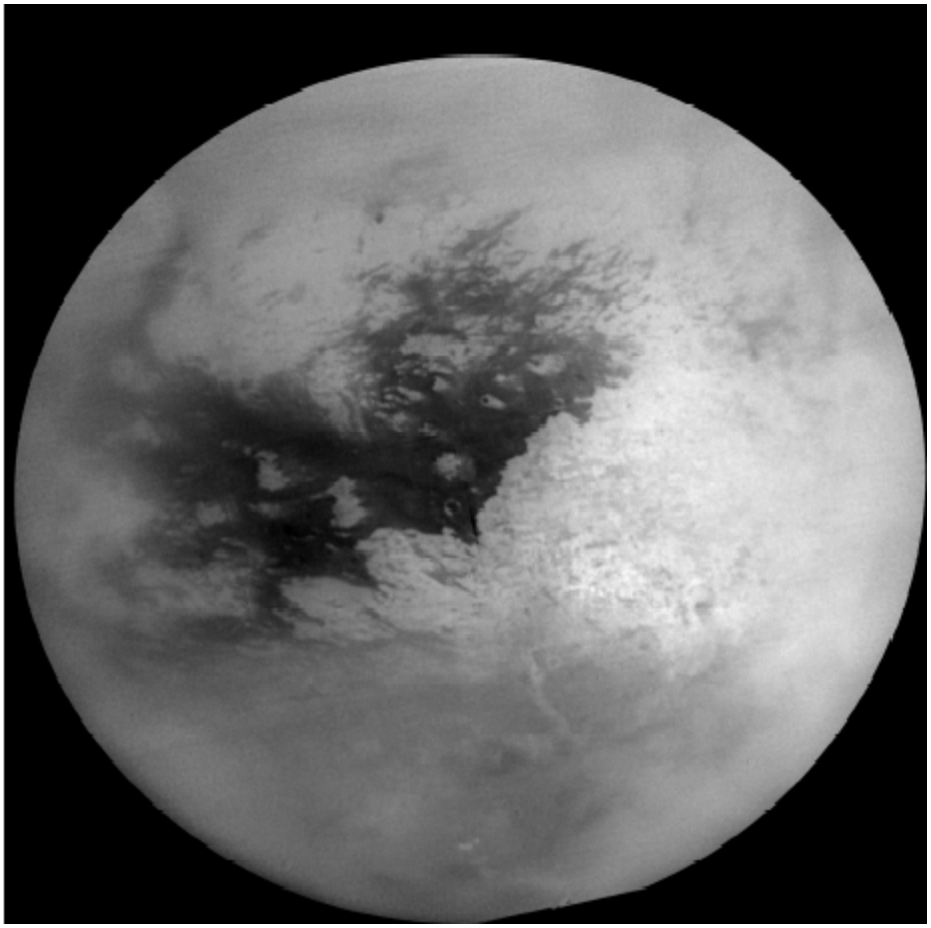
C A S S I N I



T I T A N **0 6 T I (T 5)** MISSION DESCRIPTION

April 2005

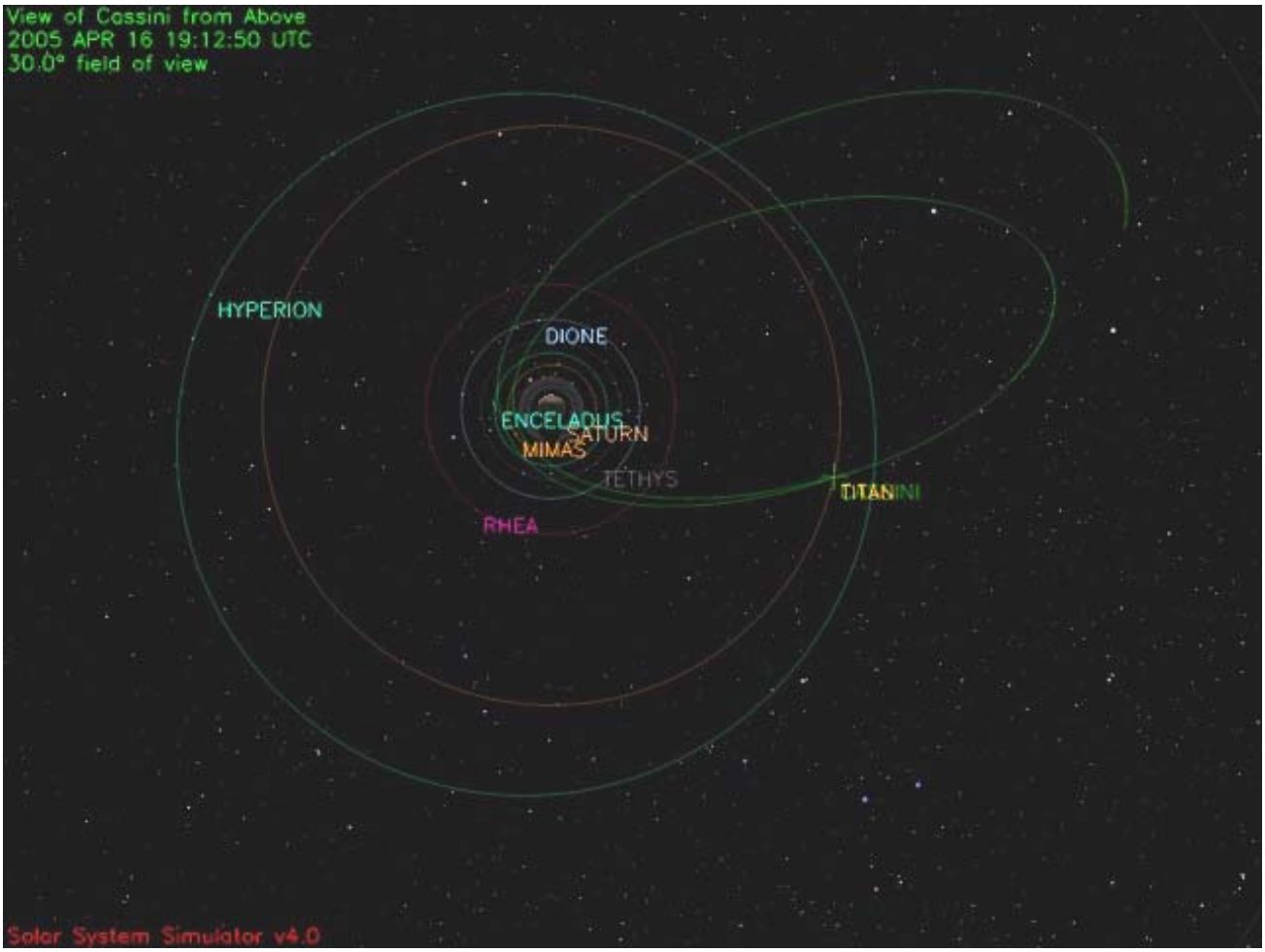
Jet Propulsion Laboratory
California Institute of Technology

PD 699-100, Rev O (supplement)
JPL D-5564, Rev O (supplement)

OVERVIEW

Closest approach of the spacecraft to the sixth targeted flyby of Titan occurs on Saturday April 16, 2005 at 19:12 Spacecraft Event Time (01:28 PM Pacific Daylight Time). Cassini's closest approach to Saturn's largest satellite is at an altitude of 1025 km (637 miles) above the surface at a speed of 6.1 kilometers per second (14,000 mph). Titan has a diameter of 5150 km (3200 miles), so the spacecraft passes within 1.4 Titan radii. The Titan-5 flyby is also the first near-polar pass – the orbiter reaches a latitude of 74 deg at closest approach.

This encounter is set up with two maneuvers: an apoapsis maneuver scheduled for April 9th, and a Titan approach maneuver, scheduled for April 13th. The flyby occurs about 2 days after Saturn periapsis on April 14th, and is therefore an outbound flyby. The orbital geometry with respect to Saturn is shown below (the viewpoint is above the Saturn North Pole, the direction to the Sun is towards the top of the page, and the spacecraft moves counter-clockwise in its orbit (shown in green)). This pass represents our minimum orbital period, as there are only 16 days between the Titan-4 and Titan-5 flybys.



1.1 ABOUT TITAN

Titan is one of the primary scientific interests of the Cassini-Huygens mission. Through observations by Earth based telescopes and the Voyager spacecraft, Titan has been revealed to be an intriguing world both similar in nature to Earth and unique among both satellites and terrestrial planets. The largest of Saturn's satellites, Titan is larger than the planets Mercury or Pluto. Titan is the only satellite in the solar system with an appreciable atmosphere. Like Earth's atmosphere, Titan's atmosphere is composed mostly of Nitrogen, yet appears to have few clouds. However, it also contains significant quantities of aerosols and organic compounds (hydrocarbons), including methane and ethane. Although Titan's thick smoggy atmosphere masks its surface, scientists have speculated Titan's surface could contain solid, liquid and muddy material creating features such as lakes, seas, or rivers. Additionally liquid reservoirs may exist beneath the surface forming geysers or volcanoes that feed flowing liquid onto the surface.

Titan's peak surface temperature is about 95 Kelvin, too cold for liquid water, and due to its thick atmosphere, the pressure at the surface is 1.6 times greater than Earth's atmosphere. At this temperature and pressure, chemicals such as methane, ethane, propane, ammonia, water-ice and acetylene may be involved in complex interior-surface-atmosphere chemical cycles resulting in eruptions, condensation and precipitation (or rain). Initial observations obtained by Cassini during the first two passes of Titan provided our first close up views of Titan in wavelengths ranging from visible light to infrared to radar. The Huygens probe successfully returned atmospheric data and images of the surface, providing ground truth for the Cassini Orbiter measurements. The results show a mysterious world even more complex than previously thought. The diversity of surface composition and its connection to Titan's geologic features remains a fundamental question. Huygens results indicate the methane exists as a liquid just below the surface and may rain from the atmosphere periodically. Clouds in Titan's atmosphere were observed in the southern hemisphere, yet no clear explanation has emerged on what the clouds are composed of, or why more clouds do not exist. Observations of Titan's interaction with Saturn's magnetosphere indicate the presence of complex processes complicated by Titan's occasional emergence out of Saturn's magnetosphere into the solar wind.

1.2 TITAN-5 SCIENCE ACTIVITIES

The Cassini/Huygens project is interested in four broad science themes concerning Titan: interior structure, surface characteristics, atmospheric properties, and interaction with Saturn's magnetosphere. Titan-5 represents the first Titan flyby with dedicated magnetospheric pointing for a large portion of the flyby.

The combination of the low altitude of the Titan-5 flyby, along with CAPS (Cassini Plasma Spectrometer) controlling the pointing starting near closest approach, will allow CAPS to take measurements near the polar (latitude 74 deg) ionosphere. The high latitude of closest approach means Cassini will be flying through the Alfven currents which couple Titan to

Saturn's magnetosphere. CAPS will continue to take high resolution data out to 120 Titan radii observing distant signatures of Titan's interaction with Saturn's magnetosphere.

CIRS (Composite Infrared Spectrometer) will attempt to detect new species in the far-infrared at high latitude (55 deg). CIRS will also map CH_4, CO, HCN, etc. using long wavelength rotational lines.

INMS (Ion and Neutral Mass Spectrometer) will perform a critical first step in sampling the global composition of the thermosphere and ionosphere. Around closest approach, INMS will measure the minor ion and neutral densities.

For ISS, T5 provides a second good look (after T4) of the sub-Saturn hemisphere, including the first high-resolution (< 250 meters/pixel) coverage of the sub-Saturn region. This will be the first good look at the quasi-circular, approximately 1000 km diameter, feature, perhaps associated with an impact structure.

T 5 is the most important flyby for MAG among all the Titan encounters of the mission. It is close to optimum for electromagnetic studies of Titan's interior via induction effects. The flyby geometry is also well suited for the study of the origin of Alfven wings and slow mode wings. The low altitude of closest approach is very favorable for studies of an internal magnetic field with a dipole near the rotation axis.

MIMI (Magnetospheric Imaging Instrument) will investigate detailed aspects of the Titan's interaction with Saturn's magnetosphere by observing through closest approach with a desirable spacecraft orientation.

RPWS (Radio and Plasma Wave Science instrument) will measure large-scale and distant aspects of Titan's interaction with Saturn's magnetosphere by observing during entire period around closest approach and from 10 to 25 Saturn radii.

UVIS (Ultraviolet Imaging Spectrograph) will continue spectral imaging to map Titan's atomic emissions, acetylene distribution, and haze properties.

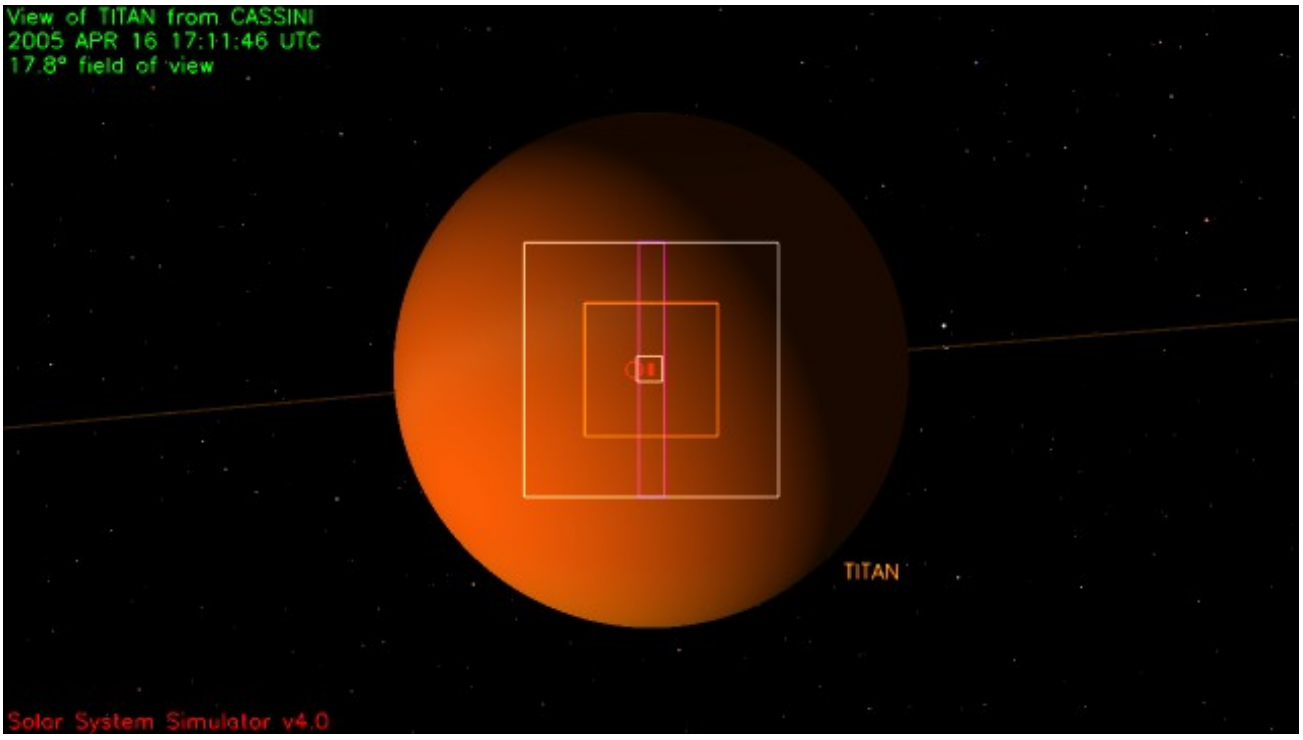
VIMS (Visible and Infrared Mapping Spectrometer) will map a portion of the northern hemisphere, study cloud formation and dissipation, and attempt to correlate composition with geological features.

1.3 SAMPLE SNAPSHOTS

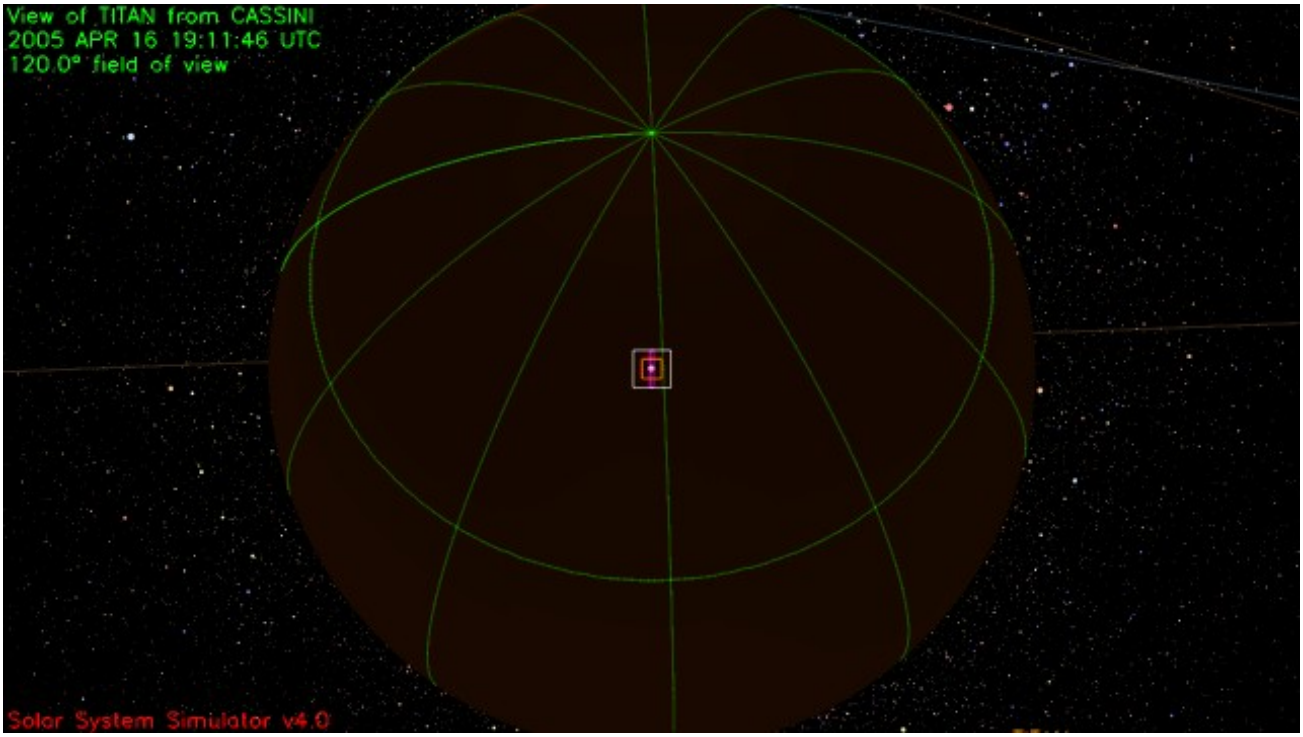
Three views of Titan from Cassini before, during, and after closest approach to Titan are shown below. The views are oriented such that the direction towards the top of the page is aligned with the Titan North Pole. Sample remote sensing instrument fields of view are drawn assuming that Cassini is pointed towards the center of Titan. The sizes of these fields of view vary as a function of the distance between Cassini and Titan. A key for use in identifying these instruments fields of view in the figures is listed below.

Key to Instrument Fields of View in Figures

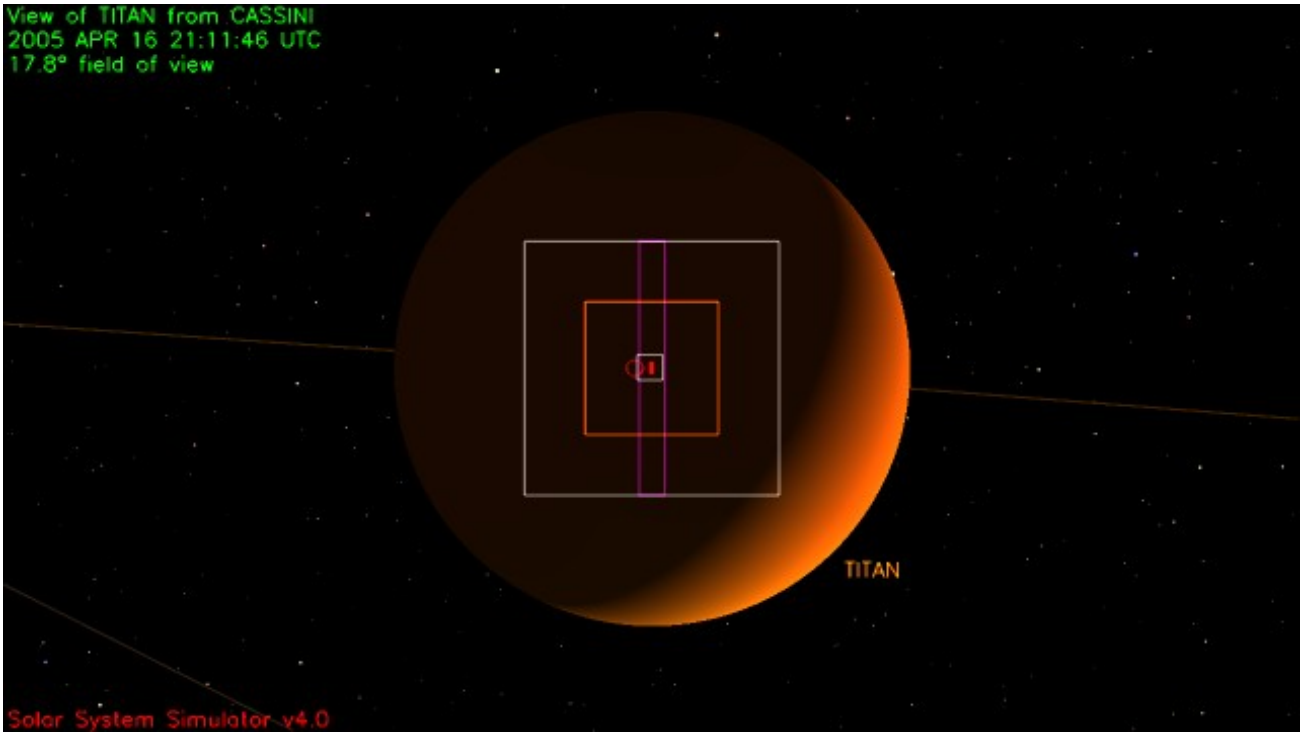
Instrument Field of View	Depiction in Figure
ISS WAC (imaging wide angle camera)	Largest square
VIMS (visual and infrared mapping spectrometer)	Next smallest orange square
ISS NAC (imaging narrow angle camera)	Smallest white square
CIRS (composite infrared spectrometer) (two fields of view)	Circle overlapping portion of smallest white square and 2 narrow slits within white square
UVIS (ultraviolet imaging spectrometer) wide	Vertical rectangle within pink lines centered within largest square



View of Titan from Cassini 2 hours Before Closest Approach



View of Titan from Cassini at Closest Approach



View of Titan from Cassini 2 Hours After Closest Approach

Cassini Titan-5 Timeline - April 2005

Colors: yellow = maneuvers; blue = geometry; pink = T5-related; green = data playbacks

Orbiter UTC	Ground UTC	Pacific Time	Time wrt T5	Activity	Description
099T05:15:00	Apr 09 06:31	Fri Apr 08 10:31 PM	T5-07d14h	Start of Sequence S10	Start of Sequence which contains Titan-5.
103T20:40:00	Apr 13 21:56	Wed Apr 13 01:56 PM	T5-02d23h	OTM #22 Prime	Titan-5 minus 3 day targeting maneuver
105T02:14:00	Apr 15 03:30	Thu Apr 14 07:30 PM	T5-01d17h	OTM #22 Backup	
106T06:25:00	Apr 16 07:41	Fri Apr 15 11:41 PM	T5-12h46m	Start of the TOST Segment	
106T06:25:00	Apr 16 07:41	Fri Apr 15 11:41 PM	T5-12h46m	Turn cameras to Titan	
106T06:55:00	Apr 16 08:11	Sat Apr 16 12:11 AM	T5-12h16m	Deadtime	Used to accommodate changes in flyby time
106T06:17:46	Apr 16 07:33	Fri Apr 15 11:33 PM	T5-12h54m	Infrared stare at high latitude	Attempt to detect new species in the far infrared
106T10:41:46	Apr 16 11:57	Sat Apr 16 03:57 AM	T5-08h30m	Titan atmospheric & surface observations	Multi-filter, wide- and narrow-angle-camera images of Titan's atmosphere and surface.
106T11:11:46	Apr 16 12:27	Sat Apr 16 04:27 AM	T5-08h00m	Spectral imaging of visible hemisphere	Several slow scans across Titan.
106T16:11:46	Apr 16 17:27	Sat Apr 16 09:27 AM	T5-03h00m	High resolution surface imaging by ISS & VIMS	12 ISS NAC footprints (some along the T03 SAR swath). Pixel scales = 725 - 250 m
106T18:11:46	Apr 16 19:27	Sat Apr 16 11:27 AM	T5-01h00m	Tranistion to Thrusters	
106T18:32:46	Apr 16 19:48	Sat Apr 16 11:48 AM	T5-00h39m	Turn to MAPS attitude	Studies of Titan's interaction with Saturn's magnetosphere
106T18:52:46	Apr 16 20:08	Sat Apr 16 12:08 PM	T5-00h19m	INMS attitude through closest approach	Composition sampling of thermosphere and ionosphere.
106T19:11:46	**Apr 16 20:27**	**Sat Apr 16 12:27 PM**	T5+00h00m	**Titan-5 Flyby Closest Approach Time**	**Altitude = 1025 km (637 miles), speed = 6.1 km/s (13,400 mph); 126 deg phase at closest approach**
106T19:23:46	Apr 16 20:39	Sat Apr 16 12:39 PM	T5+00h12m	Return to MAPS attitude for the next 16 hours	High resolution measurements of Titan's interaction with Saturn's magnetosphere. This activity continues through closest approach and out beyond 120 Titan radii.
106T19:48:46	Apr 16 21:04	Sat Apr 16 01:04 PM	T5+00h37m	Transition to Reaction Wheels	Duration = 24 minutes
106T19:51:00	Apr 16 21:07	Sat Apr 16 01:07 PM	T5+00h40m	Descending Ring Plane Crossing	
107T11:48:47	Apr 17 13:04	Sun Apr 17 05:04 AM	T5+16h37m	Deadtime	Used to accommodate changes in flyby time
107T11:59:00	Apr 17 13:15	Sun Apr 17 05:15 AM	T5+16h48m	Turn to Earth-Line	
107T12:31:00	Apr 17 13:47	Sun Apr 17 05:47 AM	T5+17h20m	Begin Playback of T5 Data	Madrid 70M
107T21:25:00	Apr 17 22:41	Sun Apr 17 02:41 PM	T5+01d02h	End Playback of T5 Data	
113T23:10:00	Apr 24 00:26	Sat Apr 23 04:26 PM	T5+07d04h	Saturn Apoapse	Saturn apoapse 007, r = 40.6 Rs, phase = 65 deg

1.4 FLYBY GEOMETRY

Event Name: T5_6TI, Targeted_Titan, Central Body: Titan Reference Trajectory: 041210AP_SCPSE_04329_08189.BSP

Event Name at Event Time Only	SCET Date (YYYY-DOYTHH:MM:SS.FF) UTC	Hours wrt Event Epoch	Minutes wrt Event Epoch	S/C Range (km)	S/C Altitude (km)	S/C North Latitude (deg)	S/C West Longitude SMEQPM Date (deg)	S/C Inertial Velocity (km/s)	S/C Radial Inertial Velocity (km/s)	S/C Tangential Inertial Velocity (km/s)	Central Body Angular Diameter (mrad)	Phase = Sun-Central_Body-S/C Angle (deg)	Sun-S/C-Central_Body Angle (deg)	S/C Local True Solar Time wrt Central Body (hh:mm)	Sub-solar Latitude wrt Central Body (deg)	Sub-solar West Longitude wrt Central Body SMEQPM Date (deg)
	2005-105T19:11:45.81	-24	-1440	515,922.6	513,347.6	3.3	5.6	6.855	-6.845	0.359	10.0	56.2	123.7	15.26	-21.6	57.2
	2005-105T23:11:45.81	-20	-1200	421,215.4	418,640.4	3.5	9.9	6.351	-6.346	0.262	12.2	55.9	124.1	15.24	-21.6	61.0
	2005-106T01:11:45.81	-18	-1080	376,187.5	373,612.5	3.6	12.0	6.172	-6.169	0.217	13.7	55.8	124.2	15.23	-21.6	62.8
	2005-106T03:11:45.81	-16	-960	332,299.7	329,724.7	3.8	14.1	6.030	-6.028	0.177	15.5	55.6	124.3	15.22	-21.6	64.7
	2005-106T05:11:45.81	-14	-840	289,314.8	286,739.8	3.9	16.1	5.919	-5.917	0.146	17.8	55.6	124.4	15.21	-21.6	66.6
	2005-106T07:11:45.81	-12	-720	247,036.8	244,461.8	4.0	18.2	5.832	-5.831	0.126	20.8	55.5	124.5	15.21	-21.6	68.5
	2005-106T09:11:45.81	-10	-600	205,302.5	202,727.5	4.2	20.1	5.767	-5.765	0.122	25.1	55.5	124.5	15.20	-21.6	70.3
	2005-106T11:11:45.81	-8	-480	163,974.8	161,399.8	4.5	22.1	5.719	-5.717	0.137	31.4	55.6	124.4	15.20	-21.6	72.2
	2005-106T13:11:45.81	-6	-360	122,936.9	120,361.9	5.0	23.9	5.687	-5.684	0.178	41.9	55.9	124.1	15.20	-21.6	74.1
	2005-106T14:11:45.81	-5	-300	102,494.5	99,919.5	5.3	24.8	5.677	-5.673	0.213	50.3	56.1	123.9	15.20	-21.6	75.0
	2005-106T15:11:45.81	-4	-240	82,087.8	79,512.8	5.9	25.6	5.671	-5.665	0.266	62.7	56.4	123.5	15.21	-21.6	76.0
	2005-106T16:11:45.81	-3	-180	61,706.6	59,131.6	6.7	26.4	5.670	-5.659	0.354	83.5	57.1	122.9	15.22	-21.6	76.9
	2005-106T17:11:45.81	-2	-120	41,345.1	38,770.1	8.4	26.9	5.677	-5.653	0.528	124.6	58.3	121.7	15.23	-21.6	77.8
	2005-106T18:11:45.81	-1	-60	21,035.5	18,460.5	13.5	26.5	5.711	-5.616	1.038	245.4	62.1	117.9	15.28	-21.6	78.8
	2005-106T18:41:45.81	-1	-30	11,036.7	8,461.7	22.9	24.4	5.778	-5.429	1.977	471.0	69.5	110.5	15.39	-21.6	79.3
	2005-106T18:56:45.81	0	-15	6,361.1	3,786.1	38.4	19.2	5.880	-4.776	3.430	833.5	82.4	97.6	16.01	-21.6	79.5
	2005-106T19:06:45.81	0	-5	4,004.7	1,429.7	66.2	-3.9	6.020	-2.559	5.449	1396.8	107.2	72.8	17.34	-21.6	79.6
T5_6TI	2005-106T19:11:45.81	0	0	3,600.0	1,025.0	74.0	-87.5	6.061	0.000	6.061	1594.0	127.2	52.8	23.08	-21.6	79.7
	2005-106T19:16:45.81	0	5	4,004.7	1,429.7	53.1	-129.4	6.020	2.559	5.449	1396.8	141.5	38.5	01.56	-21.6	79.8
	2005-106T19:26:45.81	0	15	6,361.1	3,786.1	24.0	-142.4	5.880	4.776	3.430	833.5	141.0	39.0	02.49	-21.6	80.0
	2005-106T19:41:45.81	1	30	11,036.7	8,461.7	8.3	-146.5	5.778	5.429	1.977	471.0	133.2	46.8	03.06	-21.6	80.2
	2005-106T20:11:45.81	1	60	21,035.5	18,460.5	-1.1	-148.4	5.711	5.616	1.038	245.4	127.0	53.0	03.16	-21.6	80.7
	2005-106T21:11:45.81	2	120	41,344.3	38,769.3	-6.2	-148.7	5.677	5.652	0.528	124.6	123.4	56.6	03.21	-21.6	81.6
	2005-106T22:11:45.81	3	180	61,702.5	59,127.5	-7.9	-148.3	5.668	5.657	0.354	83.5	122.1	57.9	03.23	-21.6	82.5
	2005-106T23:11:45.81	4	240	82,075.3	79,500.3	-8.7	-147.6	5.667	5.661	0.266	62.8	121.5	58.5	03.24	-21.6	83.5
	2005-107T00:11:45.81	5	300	102,464.5	99,889.5	-9.2	-146.8	5.670	5.666	0.214	50.3	121.0	59.0	03.24	-21.6	84.4
	2005-107T01:11:45.81	6	360	122,874.8	120,299.8	-9.6	-146.0	5.676	5.673	0.179	41.9	120.8	59.2	03.25	-21.6	85.4
	2005-107T03:11:45.81	8	480	163,778.7	161,203.7	-10.0	-144.3	5.692	5.690	0.139	31.4	120.4	59.6	03.26	-21.6	87.2
	2005-107T05:11:45.81	10	600	204,820.6	202,245.6	-10.2	-142.6	5.712	5.711	0.122	25.1	120.1	59.9	03.26	-21.6	89.1
	2005-107T07:11:45.81	12	720	246,026.9	243,451.9	-10.4	-140.9	5.737	5.736	0.123	20.9	119.9	60.1	03.27	-21.6	91.0
	2005-107T09:11:45.81	14	840	287,418.3	284,843.3	-10.5	-139.2	5.764	5.762	0.137	17.9	119.7	60.3	03.28	-21.6	92.9
	2005-107T11:11:45.81	16	960	329,011.0	326,436.0	-10.5	-137.5	5.794	5.791	0.160	15.7	119.5	60.5	03.28	-21.6	94.8
	2005-107T13:11:45.81	18	1080	370,817.1	368,242.1	-10.5	-135.8	5.825	5.822	0.191	13.9	119.3	60.7	03.29	-21.6	96.6
	2005-107T15:11:45.81	20	1200	412,845.4	410,270.4	-10.5	-134.1	5.857	5.853	0.228	12.5	119.1	60.8	03.30	-21.6	98.5
	2005-107T19:11:45.81	24	1440	497,589.5	495,014.5	-10.5	-130.9	5.926	5.917	0.313	10.3	118.7	61.2	03.32	-21.6	102.3

1.5 DATA PLAYBACK TIMELINE

For each science observation, the table below contains a time-ordered listing of the data playback times. One-way light time at the time of the encounter is 1 hour and 16 minutes.

Titan 06TI (T5) Approximate Playback Timeline **Created March 28, 2005**

Event or Observation	Observation Type (APGEN)	Observation Record Start Time (yyyy-dddThh:mm:ss) (SCET)	Record Start Time - Reference Epoch (ddThh:mm)	Start Playback (Ground UTC)	Start Playback (Pacific Time)
CAPS_006TI_T5EXTINB002_RIDER	CAPS_16000	2005-106T06:25:00	-00T12:47	17-Apr Sun 01:51 PM	17-Apr Sun 06:51 AM
CDA_006DR_1301DUST048_RIDER	CDA_524	2005-106T06:25:00	-00T12:47	17-Apr Sun 01:51 PM	17-Apr Sun 06:51 AM
INMS_006TI_TINTERACT002_PRIME	INMS_1498	2005-106T06:25:00	-00T12:47	17-Apr Sun 01:51 PM	17-Apr Sun 06:51 AM
MAG_006OT_SURVEY003_RIDER	MAG_1976	2005-106T06:25:00	-00T12:47	17-Apr Sun 01:51 PM	17-Apr Sun 06:51 AM
MIMI_006TI_T5EXTINB001_CIRS	MIMI_8000	2005-106T06:25:00	-00T12:47	17-Apr Sun 01:51 PM	17-Apr Sun 06:51 AM
RPWS_006TI_TINTERACT003_INMS	RPWS_30464	2005-106T06:25:00	-00T12:47	17-Apr Sun 01:51 PM	17-Apr Sun 06:51 AM
INMS_006TI_T5INBD001_RIDER	INMS_1498	2005-106T07:05:57	-00T12:06	17-Apr Sun 01:55 PM	17-Apr Sun 06:55 AM
CIRS_006TI_FIRNADCMP002_PRIME	CIRS_4000	2005-106T07:16:46	-00T11:56	17-Apr Sun 01:56 PM	17-Apr Sun 06:56 AM
CIRS_006TI_FIRNADCMP002_SI	ISS_SUPPORT_IMAGING	2005-106T07:16:46	-00T11:56	17-Apr Sun 01:56 PM	17-Apr Sun 06:56 AM
ISS_006TI_FIRNADCMP002_CIRS	ISS_Phot_1_by_1	2005-106T07:16:46	-00T11:56	17-Apr Sun 01:56 PM	17-Apr Sun 06:56 AM
UVIS_006TI_FIRNADCMP002_CIRS	UVIS_5032	2005-106T07:16:46	-00T11:56	17-Apr Sun 01:56 PM	17-Apr Sun 06:56 AM
VIMS_006TI_COMP001_CIRS	VIMS_18432	2005-106T07:16:46	-00T11:56	17-Apr Sun 01:56 PM	17-Apr Sun 06:56 AM
CIRS_006TI_FIRNADCMP003_ISS	CIRS_4000	2005-106T10:41:46	-00T08:31	17-Apr Sun 03:14 PM	17-Apr Sun 08:14 AM
ISS_006TI_PHOTOMWAC001_PRIME	ISS_Phot_1_by_1	2005-106T10:41:46	-00T08:31	17-Apr Sun 03:14 PM	17-Apr Sun 08:14 AM
CIRS_006TI_FIRNADMAP003_UVIS	CIRS_4000	2005-106T11:11:46	-00T08:01	17-Apr Sun 03:34 PM	17-Apr Sun 08:34 AM
ISS_006TI_EUVFUV001_UVIS	ISS_Phot_1_by_1	2005-106T11:11:46	-00T08:01	17-Apr Sun 03:34 PM	17-Apr Sun 08:34 AM
UVIS_006TI_EUVFUV001_PRIME	UVIS_5032	2005-106T11:11:46	-00T08:01	17-Apr Sun 03:34 PM	17-Apr Sun 08:34 AM
CDA_006RI_1800RINGM006_RIDER	CDA_524	2005-106T11:17:16	-00T07:55	17-Apr Sun 03:36 PM	17-Apr Sun 08:36 AM
1WAY_TO_2WAY_GAP_M70METNON107	P/B GAP	~5 min. Playback Gap	n/a	17-Apr Sun 04:28 PM	17-Apr Sun 09:28 AM
CDA_006DR_1901DUST021_RIDER	CDA_524	2005-106T13:18:16	-00T05:54	17-Apr Sun 04:19 PM	17-Apr Sun 09:19 AM
MAG_006TI_MAGTITAN001_PRIME	MAG_1976	2005-106T15:11:46	-00T04:01	17-Apr Sun 05:00 PM	17-Apr Sun 10:00 AM
VIMS_006TI_HIRES001_ISS	VIMS_18432	2005-106T15:41:46	-00T03:31	17-Apr Sun 05:11 PM	17-Apr Sun 10:11 AM
CIRS_006TI_FIRNADMAP002_ISS	CIRS_4000	2005-106T16:11:46	-00T03:01	17-Apr Sun 05:30 PM	17-Apr Sun 10:30 AM
ISS_006TI_HIGHRESNA001_PRIME	ISS_Phot_1_by_1	2005-106T16:11:46	-00T03:01	17-Apr Sun 05:30 PM	17-Apr Sun 10:30 AM
UVIS_006TI_HIGHRESNA001_ISS	UVIS_5032	2005-106T16:11:46	-00T03:01	17-Apr Sun 05:30 PM	17-Apr Sun 10:30 AM
RPWS_006TI_TIINTRMED001_PRIME	RPWS_30464	2005-106T17:11:46	-00T02:01	17-Apr Sun 06:31 PM	17-Apr Sun 11:31 AM
INMS_006TI_T5RMPNT001_INMS	INMS_1498	2005-106T18:11:46	-00T01:01	17-Apr Sun 07:09 PM	17-Apr Sun 12:09 PM
MIMI_006TI_T5CLOSE001_INMS	MIMI_8000	2005-106T18:11:46	-00T01:01	17-Apr Sun 07:09 PM	17-Apr Sun 12:09 PM
CAPS_006TI_T5CLOSE001_INMS	CAPS_16000	2005-106T18:19:46	-00T00:53	17-Apr Sun 07:10 PM	17-Apr Sun 12:10 PM
UVIS_006SW_IPHSURVEY004_RIDER	UVIS_5032	2005-106T18:41:46	-00T00:31	17-Apr Sun 07:15 PM	17-Apr Sun 12:15 PM
RPWS_006TI_TICA001_PRIME	RPWS_182784	2005-106T18:42:46	-00T00:30	17-Apr Sun 07:15 PM	17-Apr Sun 12:15 PM
CAPS_006TI_TITANPTG001_PRIME	CAPS_16000	2005-106T18:44:46	-00T00:28	17-Apr Sun 07:16 PM	17-Apr Sun 12:16 PM
INMS_006TI_T5RMPNT002_PRIME	INMS_1498	2005-106T18:52:46	-00T00:20	17-Apr Sun 07:22 PM	17-Apr Sun 12:22 PM
CAPS_006TI_TITANPTG002_PRIME	CAPS_16000	2005-106T19:23:46	00T00:10	17-Apr Sun 07:43 PM	17-Apr Sun 12:43 PM
INMS_006TI_T5RMPNT002_INMS	INMS_1498	2005-106T19:23:46	00T00:10	17-Apr Sun 07:43 PM	17-Apr Sun 12:43 PM
RPWS_006TI_TIINTRMED002_PRIME	RPWS_30464	2005-106T19:40:46	00T00:27	17-Apr Sun 07:55 PM	17-Apr Sun 12:55 PM
CAPS_006TI_T5EXTOUT002_RIDER	CAPS_16000	2005-106T20:11:46	00T00:58	17-Apr Sun 08:01 PM	17-Apr Sun 01:01 PM
CAPS_006TI_TITANPTG003_PRIME	CAPS_16000	2005-106T20:11:46	00T00:58	17-Apr Sun 08:01 PM	17-Apr Sun 01:01 PM
INMS_006TI_T5OUTBD001_RIDER	INMS_1498	2005-106T20:11:46	00T00:58	17-Apr Sun 08:01 PM	17-Apr Sun 01:01 PM
MIMI_006TI_T5EXTOUT001_CAPS	MIMI_8000	2005-106T20:11:46	00T00:58	17-Apr Sun 08:01 PM	17-Apr Sun 01:01 PM
RPWS_006TI_TINTERACT002_INMS	RPWS_30464	2005-106T21:11:46	00T01:58	17-Apr Sun 08:07 PM	17-Apr Sun 01:07 PM
MAG_006OT_SURVEY004_RIDER	MAG_1976	2005-106T23:11:46	00T03:58	17-Apr Sun 08:21 PM	17-Apr Sun 01:21 PM
INMS_006SA_SURVEY005_RIDER	INMS_1498	2005-107T07:11:46	00T11:58	17-Apr Sun 09:12 PM	17-Apr Sun 02:12 PM
CAPS_006SA_SURVEY005_RIDER	CAPS_16000	2005-107T11:55:49	00T16:42	17-Apr Sun 09:41 PM	17-Apr Sun 02:41 PM
MIMI_006CO_SURVEY004_RIDER	MIMI_8000	2005-107T11:55:50	00T16:42	17-Apr Sun 09:41 PM	17-Apr Sun 02:41 PM
RPWS_006SA_OUTSURVEY003_PRIME	RPWS_30464	2005-107T12:14:56	00T17:02	17-Apr Sun 09:42 PM	17-Apr Sun 02:42 PM
CIRS_006IC_DSCAL1163_RIDER	CIRS_4000	2005-107T14:00:00	00T18:47	17-Apr Sun 05:50 PM	17-Apr Sun 10:50 AM
CAPS_006CO_MAGBNDCOR001_PRIME	CAPS_16000	2005-107T21:25:00	01T02:12	17-Apr Sun 10:40 PM	17-Apr Sun 03:40 PM
INMS_006CO_MAGBOUND002_CAPS	INMS_1498	2005-107T21:25:00	01T02:12	17-Apr Sun 10:40 PM	17-Apr Sun 03:40 PM
RPWS_006SA_OUTSURVEY004_PRIME	RPWS_30464	2005-107T21:25:00	01T02:12	17-Apr Sun 10:40 PM	17-Apr Sun 03:40 PM

(With improved ISS data volume estimates)

Last Updated: April 11, 2005 - Subject to change.

Orbiter UTC is the actual time of the spacecraft event.

Ground UTC is the time when the signal reaches Earth. It takes about 1 hour and 16 minutes for the signal to travel from the spacecraft to the Earth.